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CENTRAL INTELLIGENCE GROUP

INTELLIGENCE REPORT

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SUBJECT Economic Information: Plan for the Expansion of Electric Power in Manchuria

DIST. 24 January 1947

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SUPPLEMENT

25X1A6a

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25X1X6

[redacted]

25X1A6a [redacted] Note: Information contained in this report has been previously reported.

The following report was written for the Japanese Administration in Manchukuo by by K. MAEKAWA (前川), Chief Engineer in Charge of Electric Power. The exact date of the document is unknown, but dates in 1945 are mentioned, indicating either that the report was written late in the war, or that it has since been brought up to date. The following are MAEKAWA's suggestions for the expansion of electric power in Manchuria. The present Chinese Administration plans to use these as a blueprint. The document was loaned to an American observer by a Chinese electrical engineer employed by the Chinese Power Administration. The report was translated in the American observer's office. The present whereabouts of MAEKAWA are not known.

1. Analysis of Industrial Potential

a. In Manchuria coal, iron, limestone, magnesite, bauxite, and other minerals are found in abundance at locations which are comparatively close to each other. This makes their development easy. Natural resources, communications, land, water supply, labor, and electric power are factors necessary for industrial development. Various districts are studied below on the basis of these factors. (See also Attachment #1.)

b. Fushun (123-54,41-53) -- Anshan (122-57,41-04) District.

(1) This area is rich in important resources. There is coal in Fushun and Penchihu (123-43,41-20); iron ore in Anshan and Penchihu; oil shale in Fushun; magnesite in Tashihchiao (122-30,40-38); salt in Yingkou (122-13,40-40) and Kaiping (122-22, 40-24); and bauxite in Shihch'eng (coordinates unknown). Moreover, Mukden lies in the center of this area, and plays an important part in both light and heavy industry and in agriculture.

(2) The iron deposits of Manchuria equal 1,500,000,000 ton, of which one billion ton are in Anshan and one hundred million in Penchihu. Exact figures for Manchurian steel production in 1944 and 1945 are not available, but on a rough estimate 1,000,000

ton of iron and 1,000,000 ton of steel were produced during the two years. The major part of iron and steel processing is done at four furnaces, two in Anshan and two in Penchihu. The above mills once produced 350,000 ton a year, but the greater part of the steel refining plants and the factories producing by-products have been damaged. MAEKAWA believes the Anshan and Penchihu mills should process only the iron mined near them, and should not be re-equipped to process ore imported from other areas.

(3) The extraction of oil from shale is one of the foremost industries of Manchuria, which leads the world in production of this type. China has few oil fields, and production from oil shale should therefore be encouraged. The East and West Oil Refining Plants, both located in Fushun, produce 300,000 ton of oil per year. Other similar factories could be built. Development of this industry would also encourage the development of the chemical industries.

(4) Japan has no bauxite, a product necessary for the production of aluminum; but China has an abundant supply of good quality bauxite, particularly in Shantung. Because of the use that can be made of the by-products, however, and because of the availability of electric power, Manchuria is the most economical place to produce aluminum. The following factories are producing this metal:

Fushun Factory	Planned production: 15,000 ton a year. Present production: 10,000 ton
Antung Factory (124-23,40-09)	Planned production: 20,000 ton a year. Now under construction.
Antung Aluminum Factory	Planned production: 40,000 ton a year. Now under construction

Even the planned production, however, will not satisfy the demand for aluminum.

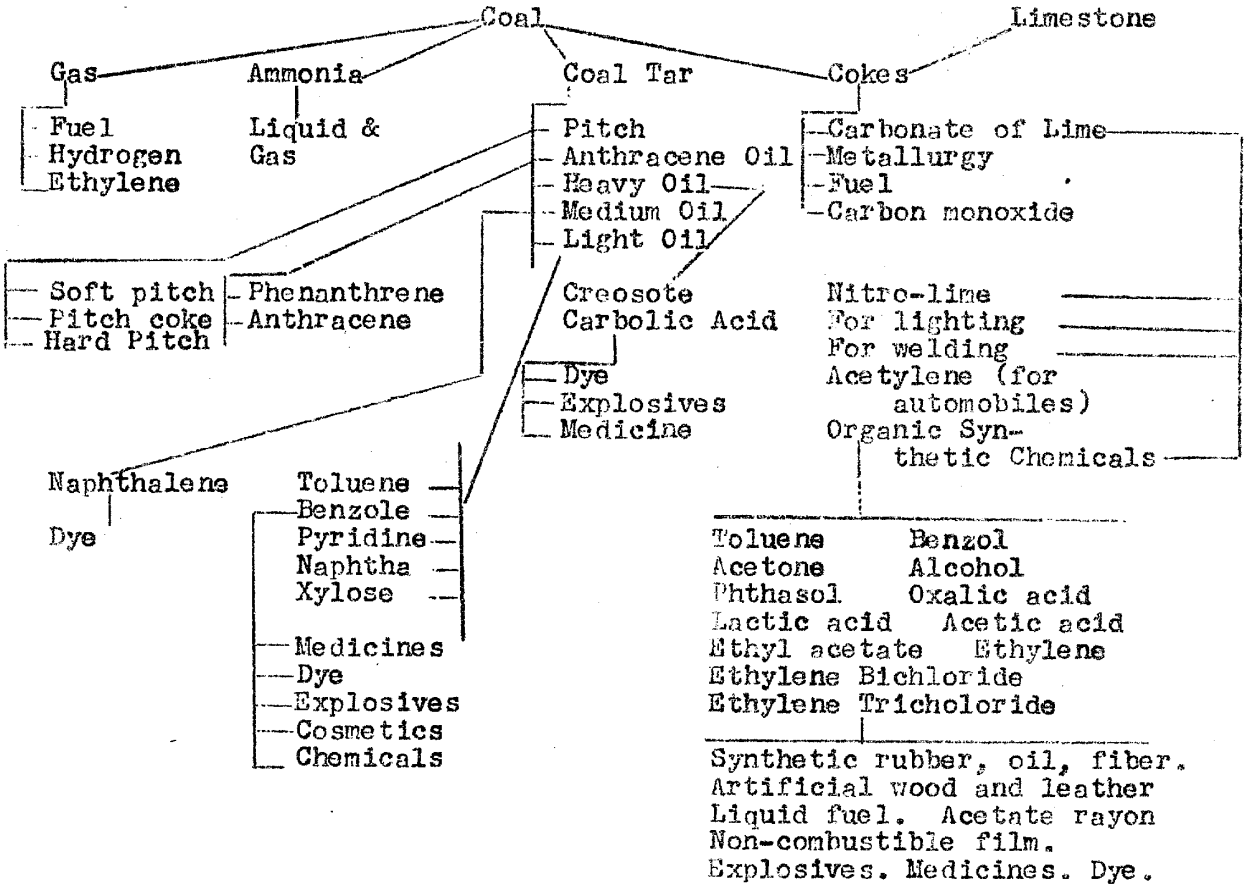
(5) Manchurian magnesite leads the world in both quality and quantity. The Yingkou Factory's yearly production is 500 ton. The extraction of pure magnesium from magnesite by the direct reduction method has passed the experimental stage and is now commercially profitable. This has made Manchuria the world's greatest producer of magnesium. The demand for the pure metal is rare, but there is a great demand for its alloys. Manchurian production of magnesium is only 30% that of aluminum, but the demand for the former is growing.

c. Tunghua Area (128-14,43-22).

(1) This district is called the unexplored storehouse of Manchuria. There are several coal and iron mines in the area, and lead and copper at Huanjen (125-25,41-16).

d. Kirin-Changchun District

(1) There is abundant electric power and an unlimited supply of limestone in this area. The products for which there is most demand are those of the organic-synthetic chemical industries listed in the chart below:



(2) Limestone found in Manchuria contains magnesium, but of an inferior quality. A high quality vein was recently discovered in Mingch'eng(明 城), however.

(3) Manchuria has to depend largely on coke, because of the insufficiency of anthracite coal. It was therefore natural that coke ovens should be promoted. The establishment of coke factories cannot be done without considering the tar industry, as the two products are closely related.

e. Antung District

(1) Since the Suiho Dam was constructed, making for a heavier flow in the Yalu River in winter, the water of the Yalu has flowed too rapidly to freeze. This fact is important in future planning and in the development of various industries.

(2) The geographic location of Antung is advantageous for using magnesite mined in Shantung. (See paragraph b4.)

(3) Lead and zinc mined in the interior are refined at Antung.

(4) Antung, with abundant electric power available, is suitable for the development of both light and heavy machine industry.

(5) In the past, this district was important for its paper industry. This had as its resources lumber cut and transported down the Yalu River. Because of the construction of the Dam, however, lumber is no longer available, and this industry must be shifted to other cities.

(6) Along with the great demand for power from the Yalu River installations, there is a related demand for electrical machinery, electrodes, and grinding compounds. Raw materials for these are found in Manchuria.

f. Liao-hsi District, at the head of the Gulf of Liao Tung.

(1) Salt is produced along the coast; coal is mined in the interior; and with magnesite available, there is a good prospect for the light metals industry and the carbonate of lime industry.

(2) Since the area was among the first to be exploited for agriculture, the urgent need of fertilizers was apparent at once. With minerals imported through Hulutao (121-01,40-44) and with coal and electric power from the interior, the Ammonia-Sulphate Fertilizer Industry could become one of the most important in the district.

g. Dairen District

(1) This area is handicapped both geographically and from the standpoint of natural resources; but if the city is opened as a free port, it is bound to become an important point for the development on industry. There are a few industries in the area now. The salt, shipbuilding, and soda industries may be called the natural industries of the district, while the fabricating and machine industries were set up for commercial or political reasons.

h. East Manchuria, including the former Manchukuo province of Chientao.

(1) At present, East Manchuria is known only for its high grade coal and lumber and for its pulp and paper industry. There are possibilities for exploiting limestone, lead, and zinc.

1. Chalainor District (117-44,49-26)

(1) The area cannot now support and does not require industrial development. The only natural resource known of at present is coal from the Chalainor mines; but scientific surveying could probably locate others.

2. Proposed Industries and Electric Power Consumption

District	Proposed Industry	Production Goal (in tons)	Power Consumption, KWH per ton	Amt of Power Required (KWH)	Power Required (KW)
Fushun-Anshan	Pig Iron	2,000,000	--	688,000,000	131,000
	Steel ingot	1,000,000	--		
	Iron ore	4,000,000	15	67,500,000	13,500
	Aluminum	15,000	50,000	750,000,000	70,000
	Magnesium	500	60,000	30,000,000	6,000
	Coal	5,000,000	15	75,000,000	34,500
	Liquid fuel	500,000	450	225,000,000	34,200
	Pulp	30,000	450	13,500,000	2,400
	Others			400,000,000	80,000
			TOTAL	2,249,000,000	371,600
Tunghua	Steel	300,000	3,000	900,000,000	12,800
	Iron ore	600,000	15	9,000,000	2,000
	Coal	6,000,000	15	90,000,000	41,000
	Others			10,000,000	9,000
			TOTAL	1,009,000,000	64,800
Kirin	Coal	4,000,000	15	60,000,000	37,000
	Carbonate of lime	300,000	4,000	1,200,000,000	101,000
	Electrodes	50,000	3,600	180,000,000	27,500
	Nitro-lime	100,000	150	15,000,000	2,300
	Others			250,000,000	38,000
			TOTAL	1,705,000,000	205,800
Antung	Aluminum	20,000	50,000	1,000,000,000	145,000
	Salt (industrial)	100,000	15	1,500,000	600
	Electrodes	100,000	3,600	360,000,000	55,000
	Grinding compounds	1,000	7,000	7,000,000	13,000
	Zinc	10,000	4,000	40,000,000	12,000
	Lead	10,000	1,500	15,000,000	53,000
	Others			100,000,000	19,000
			TOTAL	1,523,500,000	297,600

Liao-hsi	Coal	5,000,000	15	75,000,000	34,200
	Salt	500,000	15	7,500,000	3,000
	Pulp	15,000	450	67,500,000	1,100
	Zinc	10,000	4,000	40,000,000	12,000
	Lead	10,000	1,500	15,000,000	5,000
	Others			74,000,000	14,100
			TOTAL	279,000,000	69,400
Dairen	Coal	200,000	15	3,000,000	1,500
	Iron alloy	50,000	4,000	200,000,000	38,000
	Salt	750,000	15	11,250,000	4,600
	Soda	200,000	200	40,000,000	9,100
	Ammonia-Sulphate	200,000	900	180,000,000	27,500
	Others			200,000,000	40,000
			TOTAL	634,250,000	120,700
East Manchuria	Coal	5,000,000	15	75,000,000	34,200
	Pulp	100,000	450	45,000,000	6,800
	Others			90,000,000	17,100
			TOTAL	210,000,000	58,100
Chientao Province	Coal	2,000,000	15	30,000,000	13,700
	Pulp	60,000	45	27,000,000	41,000
	Zinc	5,000	4,500	22,500,000	6,000
	Lead	5,000	1,500	7,500,000	2,500
	Others			25,000,000	4,700
			TOTAL	112,000,000	67,900
Chalainor	Coal	1,000,000	15	15,000,000	2,500
	Others			5,000,000	500
			TOTAL	20,000,000	3,000
Total Proposed Industries Above:				7,741,750,000	1,286,400
Total Electric Power for General Use:				1,145,000,000	232,800
Grand Total:				8,886,750,000	1,519,200

3. Electric Power Resources

a. Most of the Manchurian Rivers are slow-flowing. Dams are therefore needed if they are to be used for water power. The following list shows rivers now being used for this purpose:

Rivers	Power Locations	Installation (KW)
Yalu (Main. 125,- , 40,-)	7	822,000
Yalu (Yu Chiang tributary)	2	650,000
Sungari River	6	1,690,000
Tumen (129,-,42,-)	5	256,000
Sou (Ussuri or Wusuli 133,-,46,- or Jao River 133,-,47,-? Subsource identifies this river as flowing into the Heilungchiang.)	3	150,000
Luan (118,-,40,-)	4	400,000
Mutanchiang (129,-,44-)	3	386,000
Others	?	480,000
	TOTAL	4,834,000

b. Coal is the chief fuel for thermal power. In the past, thermal power stations were dependent on coal of inferior quality or on gases produced in smelting furnaces. The power stations were therefore built where the fuel was available. The following coal mines are most suitable for the setting up of thermal power stations because of their location, relation to water power stations, and because of seasonal factors:

Coal Mine	Quantity of Deposits in tons	Coal Available for thermal power in tons
Fushun	950,000,000	180,000
Chiaoho (127-20, 43-43)	12,500,000	400,000
Pataohao (121-55, 41-50)	20,000,000	350,000
Fouhsin (121-39, 42-03)	7,000,000,000	500,000
Mishan (132-06, 43-35)	8,000,000,000	450,000
Chalainor (117-44, 49-26)	400,000,000	200,000
Hsingshan (130-18, 47-20)	8,000,000,000	450,000
Hsian (125-09, 42-54)	60,000,000	75,000
Peipiao (120-47 41-47)	30,000,000	45,000
Shulan (126-48, 44-21)	400,000,000	500,000
Penchihu	220,000,000	60,000

c. Water power is considered the main source of electricity, with thermal power as an auxiliary. The latter is mainly used to supply electricity during the dry season. Therefore, the amount of coal required for the thermal power stations is partially determined by the length of the draught season. In order that cities may be assured electricity at all times, an urban power station is planned for each, to provide the minimum demand for electric power within the city.

4. Proposed Expansion of Electric Power Installations and Lines.

(See Attachment 2 and 3).

a. The present period of expansion covers the completion of existing water power projects. The other four periods are of five years duration each.

b. Expansion Plan for Major Installations

	Present	1st	2nd	3rd	4th	Total
Water Power	376,000	620,000	600,000	1,300,000	900,000	3,796,000
Thermal	296,000		175,000	350,000	425,000	1,246,000
Total	672,000	620,000	775,000	1,650,000	1,325,000	5,042,000

(The unit above is KW. Figures above refer to new installations built in each period, not to combined amounts. Total refers to project on completion.)

c. Proposed Capacities of Power Installations at end of each period:

	Power Installations (KW)	Capacity (KWH)
1st	1,292,000	5,105,000,000
2nd	2,067,000	8,202,000,000
3rd	3,708,000	15,952,000,000
4th	4,981,000	19,842,000,000

d. Plan for Construction of Sub-stations

1st	600,000 KVA Capacity at Completion
2nd	1,000,000 "
3rd	1,500,000 "
4th	1,500,000 "
Total	4,600,000 "

e. Plan for Construction of Electric Transmission Lines

	200 kv lines	140 kv lines	Total
	(Unit is kilometers)		
1st	110		110
2nd	335		335
3rd	200	610	810
4th	565	505	1070
Total:	1210	1115	2325

f. The breakdown by industrial centers is as follows:

1st and 2nd Periods

Center	1st Installation KW	Possible Supliable Power KWH	2nd Installation	Power
Liao-hsi	15,000	37,000,000	55,000	292,000,000
Fushun	398,000	1,550,000,000	624,000	2,287,000,000
Antung-Dairen	225,000	1,040,000,000	425,000	2,140,000,000
Tunghua	100,000	360,000,000	350,000	1,160,000,000
Kirin-Changchun	466,000	1,285,000,000	466,000	1,725,000,000
East Manchuria	78,000	430,000,000	118,000	488,000,000
Chientao	10,000	64,000,000	20,000	112,000,000
Chalainor	--	--	--	--
Total:	1,292,000	4,766,000,000	2,058,000	8,204,000,000

3rd and 4th Periods

	3rd		4th	
Liaohsi	305,000	1,892,000,000	305,000	1,892,000,000
Fushun	713,000	3,278,000,000	913,000	3,728,000,000
Antung-Dairen	625,000	3,440,000,000	675,000	3,790,000,000
Tunghua	750,000	2,300,000,000	1,000,000	2,900,000,000

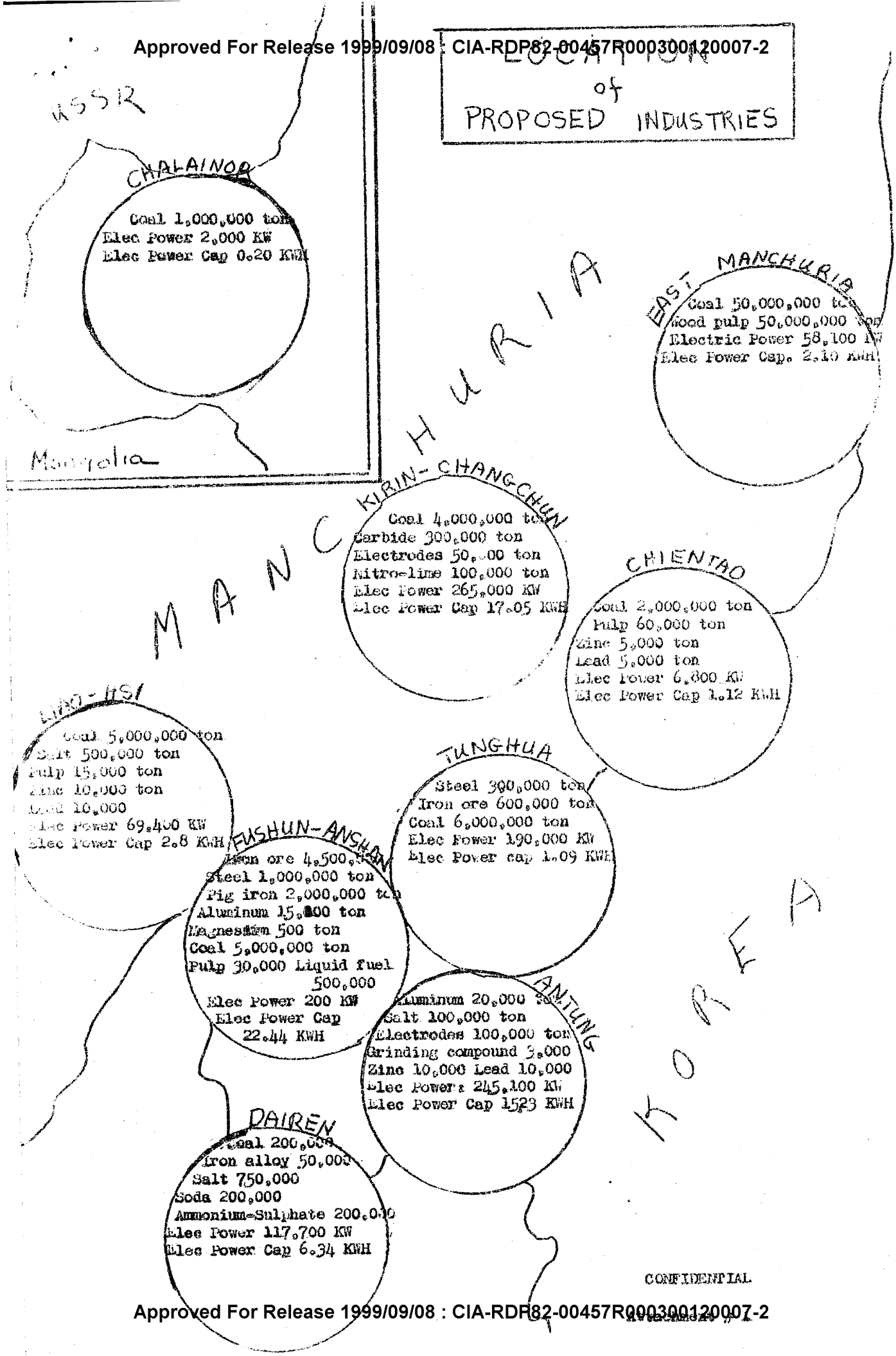
Kirin-Changchun	927,000	2,832,000,000	1,127,000	3,432,000,000
East Manchuria	368,000	1,488,000,000	636,000	2,300,000,000
Chientao	20,000	112,000,000	275,000	1,550,000,000
Chalainor	--	--	50,000	?
Total:	3,708,000	15,342,000,000	4,981,000	19,842,000,000

g. Construction Cost

It is difficult to estimate construction costs for a long-term project. However, by obtaining cost figures of commodities of a certain particular year, and using these figures as a basis, a fairly accurate estimate is possible. The cost shown on the following chart is based on prices for April 1945. The unit is Manchurian yuan.

Period	Power Station	Substation	Lines	Total
1st	212,000,000	72,000,000	7,700,000	291,700,000
2nd	640,000,000	120,000,000	23,400,000	783,400,000
3rd	1,600,000,000	180,000,000	50,850,000	1,830,850,000
4th	1,080,000,000	180,000,000	71,250,000	1,331,250,000
Total	3,532,000,000	552,000,000	153,200,000	4,237,200,000

LOCATION of PROPOSED INDUSTRIES



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ATTACHMENT # 2

Map of Existing Super-high-voltage Transmission Lines in Manchuria

Legend:

○ : Plant. Figures represent capacity in Kw.

: Power Receiving Stations and Switch stations

Paoliking

Harbin

Mutanchiang

Chiamsho

Changchun

Chin Po River

Fengman Dam

Hsian

Meihokou

Lungching

Fushun

Mukden

Fushun

Benchihu

Chingtuitzu

Yenkou

Shuifeng or Suiho Dam

Antung

Dairen

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Attachment #2

NOTE: The following sketches and figures show the installations and lines to be added in each period. Color indicates the time these were built, as follows:

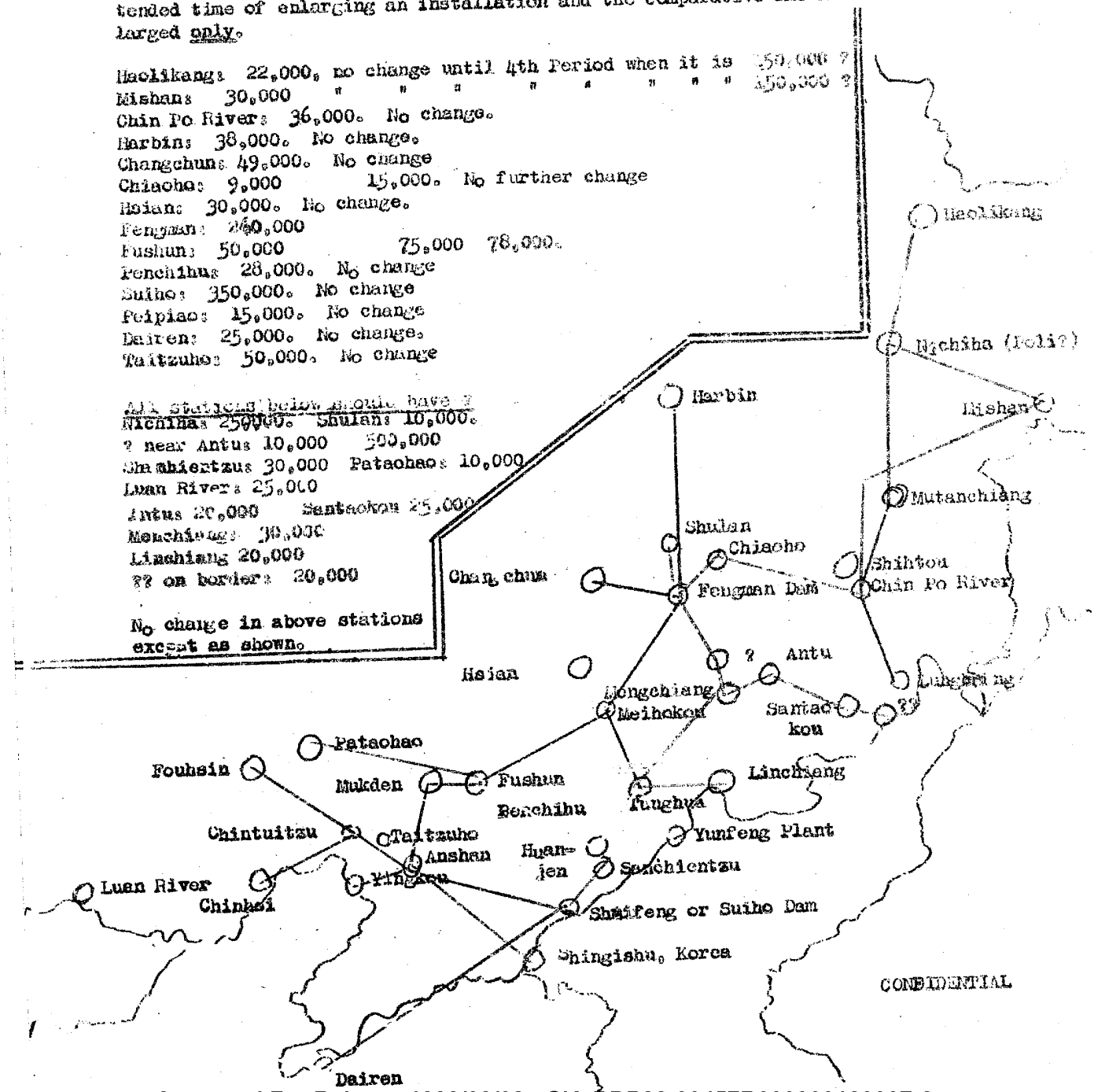
——— 1st Period (Differs from existing lines, also shown in this color, only by building of Meihokou-Tunghua power line and the station at Taitzuho. Only three installations are enlarged: Fengman from 140,000 to 260,000; Suiho Dam from 200,000 to 350,000, and Penchihu from 25,000 to 28,000.
2nd Period ——— 3rd Period ——— 4th Period

The maps from which this attachment was compiled have been carelessly drawn. Figures have been stated in terms of 10,000 KW and there has been carelessness in the placing of the decimal point. The figures below are believed by this office to be correct, but where the figures of the original have been changed, a question mark has been placed beside the figure. In all cases, the original figure was one place higher, as 150,000 instead of 15,000. No note has, however, been made when the figure has been shown incorrectly only once and the other three charts show the lower figure. In view of the above, the figures given should be taken as an indication of the intended time of enlarging an installation and the comparative amount it was to be enlarged only.

Haolikang: 22,000, no change until 4th Period when it is 150,000 ?
Mishan: 30,000 " " " " " " " 150,000 ?
Chin Po River: 36,000. No change.
Harbin: 38,000. No change.
Changchun: 49,000. No change
Chiaoho: 9,000 15,000. No further change
Hsian: 30,000. No change.
Fengman: 260,000
Fushun: 50,000 75,000 78,000.
Penchihu: 28,000. No change
Suiho: 350,000. No change
Peipiao: 15,000. No change.
Dairen: 25,000. No change.
Taitzuho: 50,000. No change

All stations below Antu have ?
Nichiha: 250000. Shulan: 10,000.
? near Antu: 10,000 500,000
Shashientzu: 30,000 Pataohao: 10,000
Luan River: 25,000
Antu 20,000 Santaokou 25,000
Menchiang: 30,000
Linshiang 20,000
?? on border: 20,000

No change in above stations except as shown.



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